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## NOTES ON DISTRIBUTION OF NORTH CAROLINA PLANTS—III

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THIS is the third<sup>1</sup> in a series of papers dealing with noteworthy records of plants in North Carolina. As in the earlier papers, examination of herbaria in North Carolina and elsewhere and the literature yielded collections or records by other collectors, some of which are cited herein. The named collections in the Gray Herbarium (G), the U. S. National Herbarium (US), and the National Arboretum Herbarium (NA) and the University of North Carolina (UNC) have been checked for North Carolina specimens of most of the taxa included. Unless otherwise indicated, all specimens cited are in the herbarium of North Carolina State College and/or Duke University.<sup>2</sup>

We are indebted to the officials of the various institutions whose facilities were placed at our disposal and particularly to members of the Department of Botany of the University of North Carolina, whose library and herbarium facilities are a continuous source of help to us.

LYCOPODIUM TRISTACHYUM Pursh. WAKE Co.: north slope of granite hill, near Neuse River at N. C. Rt. 59, December 8, 1950, *Boyce & O'Connell 1615*; WARREN Co.: moist woodland, Ridgeway, April 20, 1938, *Godfrey 3641* (G).

Blomquist (1934) refers to this as a "club-moss which belongs to the mountain flora," and he cites six county records, all from

<sup>1</sup> See Fox and Godfrey, "Notes on Distribution of North Carolina Plants—I," *Rhodora* 51: 129-146, 1949, and Fox, Godfrey and Blomquist, "Notes on Distribution of North Carolina Plants—II," *Rhodora* 52: 253-271, 1950.

<sup>2</sup> For general references, see the "Literature Cited" at the conclusion of the two previous papers.

mountain counties. Blomquist and Correll (1940) add three other mountain counties. The above station is in the extreme lower piedmont.

*DRYOPTERIS CELSA* (W. Palmer) Small. PITT Co.: in *Pinus Taeda*—*Nyssa biflora*—*Fraxinus* swamp, 0.4 mile n. w. of Shermerdine, highway No. 43, April 13, 1950, *Blomquist 14948*.

This widely distributed and puzzling fern has been found previously in the Dismal Swamp section on the border between Virginia and North Carolina (Small, 1938), and Blomquist and Correll (1940) reported it from the piedmont counties: Orange and Mecklenburg. Apparently it has a spotty distribution but, where found, seems to be thriving.

*DRYOPTERIS MARGINALIS* (L.) Gray. HARNETT Co.: Raven Rock, n. w. of Lillington on Cape Fear River, February 15, 1941, *Radford & Stewart* (UNC); granitic-schist cliffs and beech-maple woodland at Raven Rock on the Cape Fear River above Lillington, November 7, 1950, *Godfrey 51073*.

Reported as occurring sparingly in the outer piedmont, in Orange and Durham Counties, by Blomquist (1934), this fern is abundant at the above locality, which is definitely in the coastal plain.

*ATHYRIUM PYCNOCARPON* (Spreng.) Tidestr. DURHAM Co.: rich, moist woods below bluff, Eno River, Duke's Farm near Catsburg, about 8 miles n. e. of Durham, August 18, 1950, *Blomquist, Anderson, and Jones 15035*.

This fern was reported by Blomquist and Correll (1940) from 4 counties in the mountains and from Forsyth County in the piedmont, where Schweinitz collected it in "Salem, 1812-1821." The "Forsyth County" record may have come from the vicinity of Hanging Rock, Stokes County, where several montane species occur. The new location in Durham County is a remarkable eastward extension of its range.

*CAMPTOSORUS RHIZOPHYLLUS* (L.) Link. WAKE Co.: on north-facing, porous rocks 30 feet above Neuse River, 2 miles west of Stony Hill Church, March 10, 1951, *L. A. Whitford 218*.

This collection represents the easternmost known locality in North Carolina for this fern, which is primarily restricted to the mountainous part of the state. It has been reported as far east as Durham County by Blomquist (1934).

ASPLENIUM TRICHOMANES L. WAKE Co.: on cliffs, Crabtree Park, February 8, 1949, *Wells*; HARNETT Co.: Raven Rock, n. w. of Lillington on Cape Fear River, April 16, 1949, *Radford 3071* (UNC).

This fern, which is not very common anywhere in the state, was reported as far east in the piedmont as Orange County by Blomquist (1934). Both of the above collections represent eastward extensions, the latter being in the inner coastal plain.

ADIANTUM PEDATUM L. LEE Co.: rich wooded bluff near the junction of the Rocky and Deep Rivers, June 27, 1949, *Godfrey & Fox 49378*; HARNETT Co.: abundant in beech-maple woodland, bluff on Cape Fear River at Raven Rock, above Lillington, November 7, 1950, *Godfrey 51072*.

Blomquist (1934) reports this fern only from Durham, Orange and Wake Counties in the outer piedmont, the last being the easternmost known. The Harnett County location extends the range eastward and southward, definitely into the coastal plain province.

CYPERUS GRAYII Torr. PAMLICO Co.: long-leaf pine, scrub-oak sand ridge, 2 miles southwest of Arapahoe, June 28, 1948, *Godfrey 48261*; GREENE Co.: dry sandy soil waste ground, Snow Hill, July 8, 1922, *Randolph and Randolph 759* (G); WAYNE Co.: coarse sandy alluvium in seepage area, bordering sand ridge, 5 miles north of Seven Springs, September 22, 1950, *Godfrey, Fox & Boyce 50656*; SAMPSON Co.: sand ridge, 5 miles w. of Clinton, June 11, 1938, *Godfrey 4496* (G); BLADEN Co.: White Lake, June 21, 1927, *B. W. Wells*; WAKE Co.: old field, Raleigh, July 12, 1938, *Godfrey 4946* (G); HARNETT Co.: dry, sandy soil, 1 mile n. w. of Erwin, Hwy. No. 55, July 10, 1939, *Blomquist 10850*; SCOTLAND Co.: sand ridge, 5 mi. n. e. of Laurinburg, June 11, 1938, *Godfrey 4575* (G); in Oriente Carolina Septentrionalis, July, 1885, *McCarthy* (US); wet places, eastern North Carolina, August 1884, *McCarthy 82* (US).

Curtis (1867) listed this species as occurring in the "Low. Dist." (coastal plain) of North Carolina, but Small does not include it as occurring within the range of his Manual (1933) stating (p. 152) that records for the Southern States are apparently erroneous. It does not appear in Reed's "The Genus *Cyperus* in North Carolina" (*Jour. Elisha Mitchell Sci. Soc.* **52**: 295-306. 1936). Fernald, however, in Gray's Manual (1950) has the range, "Mass. to Fla." and the above records indicate a fairly common occurrence in the coastal plain of this state.

ELEOCHARIS ACICULARIS (L.) R. & S. COLUMBUS Co.: sandy alluvium, drainage canal at roadside, bordering swamp forest along Waccamaw River between Ash and Old Dock, June 10, 1951, *Godfrey & Blomquist 51174*.

Fernald (RHODORA **39**: 359 and 389. 1937) reports this plant from southeastern Virginia, saying that it would be hardly worth mentioning from farther north, had not Svenson (RHODORA **31**: 185. 1929) given the southern limit in the East as "Pennsylvania, West Virginia," etc. However, in Gray's Manual (1950), Fernald gives the range of the species as "Lab. to B. C., s. to N. Fla., Tenn." etc. We are not aware of the information which led Fernald, in the latter instance, to include the area of the southeastern states from Virginia to Florida in the range of the plant. We publish this record of its occurrence in southeastern North Carolina so that there will be no question that it extends at least this far south. We are indebted to Dr. H. K. Svenson of the American Museum of Natural History for the determination of this and most of the other *Eleocharis* collections cited in this paper.

ELEOCHARIS ALBIDA Torr. CARTERET Co.: in edge of Mullet Pond, Shackelford Banks opposite Beaufort, May 20, 1949, *Whitford 136*; NEW HANOVER Co.: *Spartina patens-stricta* [*stricta* in error for *alterniflora*] community, Carolina Beach, May 13, 1937, *Wells and Shunk*; marsh, Carolina Beach, June 28, 1938, *Godfrey and Wells 4787*. These North Carolina stations are in addition to the two indicated in the second paper of this series (Fox *et al.* 1950).

ELEOCHARIS CELLULOSA Torr. DARE Co.: standing water in open swale, 3 mi. w. of Old Cape Hatteras Light House, Hatteras Island, e. of Pamlico Sound, October 15, 1950, *Fosberg 17965*.

Svenson (RHODORA **31**: 152. 1929) gives the following range for this plant: "Florida to Texas, West Indies, and Central America." In correspondence, however, Dr. Svenson has told us that there is now a record of its occurrence in Georgia based upon an Eyles specimen.

ELEOCHARIS MELANOCARPA Torr. NEW HANOVER Co.: sandy upper shores of Silver Lake, Cape Fear Peninsula, near Wilmington, July 5, 1951, *Godfrey 51171*. Fox, *et al.* (1950) reported two North Carolina stations for this plant thus authenticating its occurrence here. This is the third.

ELEOCHARIS MICROCARPA Torr. PENDER Co.: cart-road in long-leaf pine savanna, 4.8 mi. w. of Hampstead, July 1, 1950, *Fox and Boyce 3765*.

This is a second record of the occurrence of the typical variety of this species for North Carolina. Fox, *et al.* (1950), reporting the first station, indicated that the range was extended northward from South Carolina. However, Fernald, in Gray's

Manual (1950), gives s. e. Virginia as the northernmost extent of its range.

ELEOCHARIS MICROCARPA Torr., var. FILICULMIS Torr. SAMPSON Co.: wet borrow-pit, near N. C. Rt. 102, just east of South River, October 14, 1951, *Fox & Boyce 5645*; BRUNSWICK Co.: large, dense mat all over the bottom of a ditch, in sand and silt, roadsides along N. C. Rt. 303, 3 miles north of Southport, August 17, 1948, *Godfrey 48379*; COLUMBUS Co.: sandy alluvium, drainage canal at roadside, bordering swamp forest along Waccamaw River, between Ash and Old Dock, June 10, 1951, *Godfrey & Blomquist 51173*; MOORE Co.: on mud in the edge of Juniper Lake, 3 miles west of Pinehurst, September 10, 1949, *Whitford 152*.

Although this variety is known to occur from Connecticut to Florida, Svenson (RHODORA 39: 229. 1937) reports it from North Carolina only from the Wilmington area, on the basis of collections of Canby and Curtis.

ELEOCHARIS PARVULA (R. & S.) Link. BRUNSWICK Co.: peat bog, Smith's Island, July 3, 1940, *Wells*. To the first station reported for North Carolina by Fox, et al. (1950), this citation is added.

ELEOCHARIS ROBBINSII Oakes. BLADEN Co.: abundant in a shallow, borrow-pit pond, 2.5 miles east of Elizabethtown, along U. S. Rt. 701, July 9, 1949, *Godfrey and Fox 49487*.

In his citations from the numerous specimens of this species examined by him, Svenson (RHODORA 31: 154-155. 1929) has none from between Delaware and Georgia. Fernald, in Gray's Manual (1950), indicates that its distribution south of Delaware is local and as follows: "n. e. N. C.; centr. Ga. to n. Fla." This collection, then, indicates its occurrence in the southeastern portion of North Carolina, as well as in the northeastern.

ELEOCHARIS TENUIS Willd., var. PSEUDOPTERA (Weatherby) Svenson HYDE Co.: moist roadside, 5 miles w. of Fairfield, May 8, 1938, *Godfrey and Kerr 3858*. An outer coastal plain station for a plant the range for which Svenson (RHODORA 41: 65-66. 1939) and Fernald, in Gray's Manual (1950), give as s. e. New York and New Jersey along the mountains to North Carolina and eastern Tennessee.

ELEOCHARIS TORTILIS (Link.) Schultes. WAYNE Co.: the Cliffs of the Neuse River, July 2, 1946, *B. W. Wells*; NEW HANOVER Co.: wet, burned-over pocosin, along Cape Fear River, June 24, 1938, *Godfrey 4713*.

Svenson (RHODORA 39: 245-247. 1937) cites two collections of this species from North Carolina, one of Curtis (1834) (presumably from Wilmington) and one of Blankinship (1895) from Southern Pines.

*BULBOSTYLIS FLORIDANA* (Britton) Fern. ROBESON Co.: dry, sandy roadside, 7 miles southeast of Lumberton, July 4, 1927, *Wiegand & Manning 657* (G); DURHAM Co.: in garden, 922 Demerius Street, Durham, October 7, 1950, *Blomquist 15046*. Small (1933) gives the range (as *Stenophyllus barbatus* (Rothb.) Britton) as "Fla. to Ala. and S. C."

*RHYNCHOSPORA DEBILIS* Gale. BERTIE Co.: dry pocosin clearing, 1/2 mile north of Powellville, July 23, 1949, *Godfrey and Fox 49694*; LENOIR Co.: dry pocosin, 8 1/2 miles north of Richlands, July 16, 1949, *Godfrey and Fox 49606*; BLADEN Co.: savanna, 19 miles northwest of Elizabethtown, along N. C. Rt. 87, July 9, 1949, *Godfrey & Fox 49483*; pineland clearing, 14 miles north of Elizabethtown, on N. C. Rt. 242, July 9, 1949, *Godfrey & Fox 49508*. These additional stations bring the total to six North Carolina coastal plain counties from which the plant is known (see Fox & Godfrey, 1949).

*RHYNCHOSPORA MACROSTACHYA* Torr., var. *COLPOPHILA* Fern. & Gale CHOWAN Co.: river swamp clearing, east end of Chowan River bridge west of Edenton, October 5, 1950, *Godfrey & Fox 50965*. For this variety, this is an extension of range southward from southeastern Virginia.

*RHYNCHOSPORA MIXTA* Britton. NEW HANOVER Co.: swamp forest, Island Creek, on Hampstead-Castle Hayne Road, July 1, 1950, *Fox & Boyce 3769*; PENDER Co.: gum swamp 2 1/2 miles west of Hampstead, July 1, 1950, *Fox & Boyce 3763*.

These collections added to the four previously recorded well-scattered stations in North Carolina (see Fox & Godfrey, 1949), indicate that this species is probably frequent in the swamp forests of the coastal plain of the state.

*RHYNCHOSPORA PLEIANTHA* (Kirk.) Gale. BRUNSWICK Co.: forming extensive mats, sandy peaty pond margin, Marsh Branch, River Road, north of Southport, June 14, 1949, *Godfrey 49348*; abundant on the sandy margin of Pretty Pond, July 27, 1949, *Godfrey 49706*.

Gale (1944) had two collections of this plant from North Carolina, the only ones north of Georgia, and both were from within a few miles of Wilmington and near the stations cited here. She described the plant as caespitose, but at our stations such is distinctly not the case. The plants at these stations had abundant slender stolons, and as a consequence of this habit, formed a thick matted cover along the marginal strands of both ponds where they were encountered.

*CAREX BROMOIDES* Schkuhr. TRANSYLVANIA Co.: very abundant as large clumps on a seepage bog on a steep slope above Whitewater River, just above Upper Falls, June 7, 1951, *Godfrey 51287a*; HAYWOOD Co.: (presumably): wet places near Waynesville, at elevation of 4,500 feet, June 10, 1897, Biltmore Herbarium 196b (US).

This sedge, the habitat of which is usually given as swamps or swampy woodlands, is primarily a plant of the coastal plain, all of the other specimens from North Carolina which we have seen being from the outer coastal plain. Our collection, from the southern escarpment of the Appalachians at an elevation of about 2600 feet above sea level, and the Biltmore specimen establish its occurrence at relatively high elevations in the state.

CAREX CHAPMANNI Steud. CRAVEN Co.: in swampy woods about 1 mile west of Cherry Point, off Highway No. 70, old road to Morehead City, April 28, 1951, *Blomquist 15106*. According to Small (1933) and Mackenzie (1940), this sedge is known only from "Hammocks and woodlands, Fla."

CAREX CRISTATELLA Britton. JACKSON Co.: in swamp to left of railroad, just west of Balsam Station, June 18, 1934, *Boggess 38*; SWAIN Co.: grass-sedge ridge, south of Clingman's Dome, Great Smokies, June 27, 1937, *Blomquist & Billings 9642*.

This sedge has not previously been reported for North Carolina, and according to the ranges given by Mackenzie (1940) and in Gray's Manual (1950), these collections represent an extension southward from West Virginia and Virginia.

CAREX DIVISA Huds. NEW HANOVER Co.: in moist sandy soil with *Spartina patens*, etc., west side of monument, Fort Fisher, April 26, 1951, *Blomquist 15064*. This naturalized European sedge is reported in Gray's Manual (1950) only from "coastal sands, local, Calvert Co., Maryland."

CAREX JOORI Bailey. CUMBERLAND Co.: low, wooded bank of South River, below N. C. Rt. 102, 3 miles south of Falcon, October 14, 1951, *Fox & Boyce 5641*. To the two North Carolina stations for this sedge published by Fox and Godfrey (1949), this third is added.

CAREX LOUISIANICA Bailey. MARTIN Co.: abundant in floodplain woodland along the Roanoke River at Hamilton, September 23, 1950, *Godfrey, Fox & Boyce 50694*; PITT Co.: abundant in floodplain forest, Tar River at Greenville, September 23, 1950, *Godfrey, Fox & Boyce 50670*; CHATHAM Co.: abundant in floodplain woodland along New Hope Creek, U. S. Rt. 64, east of Pittsboro, May 6, 1951, *Godfrey & Fox 51111*. Mackenzie (1940) gives a range which includes North Carolina, but, apparently, this plant has been rarely collected in the state, our own collections listed above being the only ones we have been able to locate.

CAREX SPARGANOIDES Muhl. JACKSON Co.: rich soil, wood's road through second growth woodland, base of Cedar Cliff Mt., s. e. of Tuckaseegee, June 6, 1951, *Godfrey 51259*.

Curtis (1867) lists this species as occurring in the "Mid. Dist." (piedmont) of North Carolina. However, Small (1933)

fails to include it within the range of his manual; Mackenzie (1940) and Fernald in Gray's Manual (1950) regard Virginia as the southeastern limit of its range.

CAREX VERRUCOSA Muhl. NEW HANOVER Co.: (presumably) border of pine barren ponds, Wilmington, *Curtis* (G); BRUNSWICK Co.: small cypress pond, to the south of the railroad and church, just south of U. S. Rt. 76 at Maco, May 21, 1949, *Godfrey 49189*; same locality, July 30, 1949, *Fox & Godfrey 2865*; HARNETT Co.: Aug. 16, 1932, Blomquist.

In view of the fact that Small (1933) and Mackenzie (1940) give the northern limit of the range as South Carolina, we list these collections to record its occurrence in North Carolina. We are indebted to Dr. F. J. Hermann of the Bureau of Plant Industry for verifying the determinations most of our collections of *Carex*.

AGAVE VIRGINICA L. CLAY Co.: rocky bank, on U. S. Rt. 64, 2 miles southeast of Brasstown, August 7, 1951, *Fox & Godfrey 5178*; CHEROKEE Co.: rocky road bank, on Hiawasse River, on U. S. Rt. 64, 2 miles east of Murphy, July 14, 1950, *Fox 4028*; CLEVELAND Co.: rocky hillside, north bank of Broad River, above N. C. Rt. 150, 3½ miles south of Boiling Springs, July 12, 1950, *Fox 3928*; UNION Co.: abundant along banks of Rocky River near Crooked Creek, July 18, 1949, *Boyce 1096*; MONTGOMERY Co.: thin soil on bluff, lower power dam below Badin, August 9, 1938, *H. J. Oosting 1891*; ORANGE Co.: rocky bluff, north side of Morgan's Creek, about ½ mile east of Pittsboro Road, Chapel Hill, September 8, 1933, *W. C. Coker* (UNC); CUMBERLAND Co.: on sandy rocky hillside, about 6 miles southeast of Fayetteville, just west of Mineral Spring Swamp, October 3, 1938, *H. A. Rankin* (UNC).

Although the ranges given by Small (1933)—(as *Manfreda virginica* (L.) Salisb.)—and by Fernald in Gray's Manual (1950) extend into or across North Carolina, there seem to be so few collections of this uncommon species from this state that it is deemed worthwhile to list here all that we have seen.

CARDAMINE DOUGLASHII (Torr.) Britt. WAKE Co.: wooded floodplain of Neuse River, 2½ miles west of Stony Hill Church, March 25, 1951, *Wells*; DURHAM Co.: floodplain woods, Eno River north of Durham, old Oxford Road, March 8, 1946, *Oosting 2219*; moist wood soil, side of ravine, Perry's Cabin, Wake Forest Road, March 15, 1946, *A. Davison*. According to the range given in Gray's Manual (1950) these collections extend the range southward from Virginia.

PRUNUS MITIS Beadle. CLEVELAND Co.: woods border, sandy clearing on Broad River, 3½ miles south of Boiling Springs, July 12, 1950, *Fox 3939*.



While not qualified to pass judgment on the validity of this segregate species, we can report that plants which fit the key and description in Small's Manual (1933) occur at the above locality. The range given by Small (*loc. cit.*) is in Georgia and Alabama.

PRUNUS INJUCUNDA Small. CABARRUS Co.: upland, road border, near Rocky River on N. C. Rt. 151, July 7, 1950, *Fox & Whitford 3841*; CLEVELAND Co.: alluvial, wooded bank of Broad River, 3½ miles south of Boiling Springs, July 12, 1950, *Fox 3914*.

With the same qualification as that under *P. mitis* above, we report this taxon as occurring in North Carolina, the range in Small's Manual (1933) being: "Piedmont, Ga. and Alabama."

PRUNUS PUMILA L. DURHAM Co.: shrubby ground, edge of pine woods, 200 ft. south of r. r. tracks near Old Oxford Road, May 10, 1950, *Blomquist 14945*.

Memminger (*Jour. Elisha Mitchell Sci. Soc.* **30**: 136. 1915) reported *P. cuneata* Raf. from Henderson County, N. C., and the range in Small's Manual (1933) indicates its occurrence in this state. However, Fernald in Gray's Manual (1950), where *P. cuneata* Raf. is regarded as synonymous with *P. susquehanae* Willd. and where *P. pumila* L. is kept separate, has not reported any of the species of this complex ranging as far south as North Carolina. Without going into the problem of specific concepts, we can report here that *P. pumila* L. (*sensu lat.*) occurs in the outer edge of the piedmont province in this state. Dr. Rogers McVaugh has seen our specimen and verifies the determination in the sense of the previous sentence.

CNIDOSCOLUS STIMULOSUS (Michx.) Gray. CLEVELAND Co.: sandy, open, disturbed area, south bank of Broad River, 3½ miles south of Boiling Springs, July 12, 1950, *Fox 3932*.

Although Small (1933) gives the distribution of this plant (as *Bivonea* Raf.) as "coastal plain and adjacent provinces" and Blomquist and Oosting (1948) in their treatment of the N. C. Piedmont flora state (under the name, *Jatropha* Michx.) that it is "occasional along the margin of the Coastal Plain," we have seen no specimens or records from the upper piedmont region. This appears to be a considerable extension inland of a plant primarily confined to coarse sandy soil in the coastal plain.

TRAGIA LINEARIFOLIA Ell. CUMBERLAND Co.: turkey-oak sandhills, near U. S. Rt. 301, 5 miles south of Fayetteville, July 8, 1949, *Fox & Godfrey 2618*; HOKE Co.: dry, weedy soil along Drowning Creek, near Wagram, June 18, 1935, *Correll 1149*. Small (1933) gives the range for this species as "Coastal Plain, Fla. to Ala."; thus, this appears to be a considerable northward extension of range.

HIBISCUS MILITARIS Cav. PERQUIMANS Co.: creek swamp on U. S. Rt. 17, 5 miles south of Hertford, August 5, 1950, *Fox 4176*; NASH Co.: alluvial plain, Swift Creek, on N. C. Rt. 301, 2 miles north of Battleboro, July 22, 1949, *Fox & Godfrey 2738*; CUMBERLAND Co.: wet ditch, about 1 mile northeast of Godwin, on U. S. Rt. 301, July 24, 1948, *Fox & Whitford 1768*; "Carolina," *Curtis* (no other data given—in Gray Herbarium).

Curtis (1867) gives "Low. Dist." and Wood & McCarthy (1886) report this species for Wilmington. It is in the list for Church's Island by McAtee (1919). The ranges given by Small (1933) and Fernald in Gray's Manual (1950) extend across North Carolina. However, the above-listed collections are all that we have seen, and it seems worthwhile to record them here for it has been rarely collected in North Carolina.

HIBISCUS PALUSTRIS L. (sensu Fernald in RHODORA 44: 269. 1942) JONES Co.: ditch by U. S. Rt. 70, 2.9 miles west of Dover, July 14, 1949, *Fox & Godfrey 2667*. To the four county records previously published by us for this species, this one is added.

LECHEA VILLOSA Ell. CLEVELAND Co.: sandy, open disturbed area, south bank of Broad River, 3½ miles south of Boiling Springs, July 12, 1950, *Fox 3934*; CHEROKEE Co.: sandy old field, bank of Hiawasse River at U. S. Rt. 64, Aug. 7, 1951, *Fox & Godfrey 5177*.

Hodgdon (RHODORA 40: 55. 1938) maps the range of the species showing that it is principally confined to the coastal plain in North Carolina. The locality of the first of the above stations is well within the upper piedmont. There are no collections of this species in the several eastern herbaria from outside of the coastal plain and extreme lower piedmont, and these represent a considerable extension inland, the Cherokee County locality being west of the Blue Ridge. Dr. Hodgdon has verified our determination of these specimens.

VIOLA FLORIDANA Brainerd. WILSON Co.: wet woodland, vicinity of marl pits, A. Corbett Farm, near Wilson, April 10, 1949, *Godfrey 49024*; CARTERET Co.: edge of woodside ditch between Atlantic and Salter Path, Bogue Bank, May 27, 1951, *Blomquist 15093*.

Small (1933) gives the range for this violet as central and northern Florida, but Brainerd (Vermont Agri. Expt. Sta. Bull.

224: 32, 1921) cites a specimen from Beaufort, South Carolina. Blomquist and Oosting (1948) have included it as a part of the piedmont flora of North Carolina.

LUDWIGIA BREVIPES (Long) E. H. Eames. CURRITUCK Co.: bog on Knott's Island, July 6, 1950, *Radford 5445*; DARE Co.: sandy margin of freshwater pond, Kill Devil Hills, October 7, 1950, *Fox & Godfrey 4445*; HYDE Co.: mudflat near causeway on n. side of Lake Mattamuskeet, July 4, 1950, *Radford 5397* (UNC); JOHNSTON Co.: in the shallows of Holt's Lake, 4 miles south of Smithfield, June 24, 1951, *Whitford 256*; ROBESON Co.: wet mud of partially dried-up pond, near N. C. Rt. 72, Lumber River, 3 miles northwest of Lumberton, October 6, 1951, *Fox 5573*.

We list these collections here because Munz (Bull. Torr. Bot. Club **71**: 156. 1944) cited only one specimen from North Carolina (Pasquotank County). These collections indicate at least a scattered distribution across the coastal plain of this state.

ARALIA RACEMOSA L. DURHAM Co.: rich soil under hardwoods, base of river bluff, Eno River about 1 mile above its confluence with Flat River, August 18, 1950, *Blomquist, Anderson & Jones 15033*. This plant, primarily confined to the mountains of the state, is hitherto unknown to us from the outer piedmont.

PANAX QUINQUEFOLIUS L. DURHAM Co.: rich soil under hardwoods, base of river bluff, Eno River, about 1 mile above its confluence with Flat River, August 8, 1950, *Blomquist, Anderson & Jones 15032*; ORANGE Co.: upper Laurel Hill, October 3, 1909, *Coker* (UNC); several other specimens from same locality by other collectors (UNC). Ginseng, which is not any longer common anywhere in the state, is apparently rare in the piedmont province. It is not included by Blomquist and Oosting (1948).

ERYNGIUM MARITIMUM L. DARE Co.: abundant locally on beach dunes, opposite Owens' Tourist Court, Nag's Head, Aug. 4, 1950, *Fox 4133*.

We are informed by Dr. Lincoln Constance, who determined this collection for us, that this European species is known elsewhere in North America only from Ellis Island, N. Y. It is well established on the beach dunes at Nag's Head over an area several hundred yards in extent.

ERYNGIUM PROSTRATUM Nutt. PITT Co.: in abandoned lumber road across floodplain woodland, Tar River at Greenville, Sept. 23, 1950, *Godfrey, Fox & Boyce 50670a*.

Rodgers (Jour. Elisha Mitch. Sci. Soc. **66**: 217, 218. 1950), in discussing the range of this plant, indicates that it is unknown from North Carolina although its occurrence in both South Carolina and Virginia has been recorded. In a footnote he

mentions Godfrey's having written him about a prostrate *Eryngium* collected on the Tar River. The above collection, which he had not seen at that time, is the one to which he referred, and it proved to be *E. prostratum*.

LEIOPHYLLUM BUXIFOLIUM (Berg.) Ell., var. HUGERI (Small) C. K. Schneider. GASTON Co.: crevices in cliff below pinnacle of King's Mountain, elev. about 1700 ft., June 15, 1951, *Fox 4831*.

Camp (Bull. Torr. Bot. Club **65**: 99-104. 1938) discusses the remarkable distribution of this genus. He cites collections from the coastal plain and from the extreme upper piedmont and mountains of North and South Carolina but none within fifty miles of King's Mountain. Since he postulates (*ibid.*, p. 100) that the piedmont was the "home of the basic species," it is felt that a record from this conspicuous granitic prominence, located approximately in the center of the piedmont in North Carolina, is significant. Camp's citation of a specimen from Cumberland County (in the upper coastal plain) is based on cultivated material "taken from plants said to be 'plentiful' near Fayetteville." We can state that it is abundant in several localities in the turkey-oak sandhills region south of Fayetteville in Cumberland County, particularly near Rockfish Creek; specimens from the area are now in several herbaria.

SWERTIA CAROLINENSIS (Walt.) Ktze. (*Frasera carolinensis* Walt.). CLAY Co.: roadside clearing, edge of upland woods, on U. S. Rt. 64, 2.7 miles west of Glade Gap, July 14, 1950, *Fox 4017*; MACON Co.: maple-birch-magnolia (cove) association, Olivine Deposit No. 9, 1/2 mile southwest of Ellijay, June 19, 1946, *Radford* (UNC); "Mountains of North Carolina," 1878, *Vasey* (US, NY).

Curtis' (1867) statement of range for this plant apparently quite rare in North Carolina is: "vallies of Macon and Cherokee." The range given by Small (1933) crosses the state as does that given by Fernald in Gray's Manual (1950). Radford (*Jour. Elisha Mitch. Sci. Soc.* **64**: 95. 1948) lists it as occurring on olivine deposits in Macon County, but we have seen no other records or collections for the state than these cited here.

ASCLEPIAS PEDICELLATA Walt. (*Podostigma pedicellata* (Walt.) Vail) PENDER Co.: Rowe's Bridge, Burgaw, May 28, 1938, *B. W. Wells*; NEW HANOVER Co.: sand ridge, Carolina Beach, June 18, 1938, *Godfrey 4658*; between Wilmington and Scott's Hill (presumably in New Hanover County), July 25, 1923, *E. J. Alexander* (UNC); BRUNSWICK Co.: wire-

grass savanna, near N. C. Rt. 303, 6 miles north of Southport, July 12, 1947, *Fox 496*; BLADEN Co.: long-leaf pine savanna, on N. C. Rt. 41, 4 miles east of White Lake, July 2, 1950, *Fox 3782*; scrub-oak sand area, dirt road, south of Ingold on road to White Lake, July 18, 1940, *Oosting 2155*.

Small (1933) gives the range of this plant as extending into North Carolina. Curtis (1833) listed a *Podostigma pubescens* Ell. for Wilmington; his later catalogue (1867) lists it for the "Low. Dist.;" Wood and McCarthy (1886) list the same for the Wilmington region. These may be regarded as based on this species, according to Dr. R. E. Woodson, Jr. (in correspondence). Dr. Woodson informs us that he has seen no specimens north of Beaufort, S. C., and it seems, therefore, worthwhile to list all of the North Carolina collections of which we are aware.

JACQUEMONTIA TAMNIFOLIA (L.) Griseb. BERTIE Co.: in field of *Crotalaria*, seed of which came from Alabama, Windsor, November 1, 1938, *B. E. Grant*; BRUNSWICK Co.: along the bank of a road-fill, Bell Swamp Bridge, near Winnabow, October 27, 1950, *Godfrey and Boyce 50959*.

These are the first North Carolina records of which we know for this adventive from the tropics. Fernald in Gray's Manual (1950) gives the range: "Fields, local, s. e. Va. and southwest." Small (1933), apparently, had not seen it from north of South Carolina.

SALVIA AZUREA Lam. RICHMOND Co.: turkey-oak sandhills on N. C. Rt. 77, 5½ miles south of Hamlet, September 16, 1950, *Fox & Godfrey 4268*; sandy soil near Hamlet, October 6, 1897, *Biltmore Herbarium 3424a* (US, G); NEW HANOVER Co.: Wilmington, September, 1888, *McCarthy* (UNC). Small (1933) gives the range as "Fla. to Tex. and S. C." We have seen neither reports nor other specimens from North Carolina.

SCROPHULARIA LANCEOLATA Pursh. CRAVEN Co.: sandy oak-hickory woods near Neuse River, 2 miles n. of Ft. Barnwell, May 27, 1951, *Radford 5711* (UNC) DURHAM Co.: ¾ mile below Michie Dam, on bluff near road, May 20, 1950, *Batson*; BURKE Co.: near lake west of Morganton, June 4, 1926, *Freeman* (NA); damp field, Jonas Ridge, July 22, 1933, *Hunnewell 12947* (G); AVERY Co.: field, Linville, July 5, 1924, *Hunnewell 9231* (G); damp gravelly roadside, Pineola, July 20, 1936, *Hunnewell 14246* (G).

This species is not included by Small (1933) nor Blomquist & Oosting (1948), but in Gray's Manual (1950) the range indicates the plant's occurrence as far south as western South Carolina. The collections cited here are from localities scattered from the outer coastal plain to the mountains.

BUCHNERA FLORIDANA Gandoger.

In our previous paper in this series (RHODORA 52: 269. 1950) this species was reported from the piedmont in Wake County; we indicated that this was an extension of range within the state from the coastal plain into the piedmont and thus into the area covered by Blomquist and Oosting (1948). Since that time, the late Dr. Francis W. Pennell examined the specimen upon which the report was based; he identified it as *B. americana* L. We, therefore, withdraw the report, yet wish to indicate that the species was previously reported by Pennell (1935) from Norlina, Warren County, which is within the range of the Blomquist and Oosting Guide (1948), and neither species is included by them.

BUCHNERA AMERICANA L. WAKE Co.: railroad savanna, just east of Durham-Wake County line, north of Morrisville, along U. S. Rt. 70A, July 13, 1949, *Godfrey 49516*; JOHNSTON Co.: savanna-like clearing near Mingo Swamp, on N. C. Rt. 421, July 2, 1950, *Fox and Boyce 3803*.

The first of the above collections we erroneously reported as *Buchnera floridana* Gandoger. We cite it again because neither species was included by Blomquist and Oosting (1948) as a part of the spring and early summer flora of the piedmont of North Carolina. Pennell (1935) had cited several piedmont stations for *B. americana* L. but he did not give the collection dates. Apparently they do begin to bloom in early July and the inclusion of both of them could now be justified.

VALERIANELLA INTERMEDIA Dyal STOKES Co.: moist, narrow flood plain, 1 mile south of Walnut Cove, April 23, 1950, *Blomquist, Godfrey and Fox 14870*; RANDOLPH Co.: moist, open woods, above stream bluff, Carraway Creek, west side of highway No. 49, May 5, 1950, *Blomquist, Anderson and Batson 14888*; SWAIN Co.: Biltmore Herbarium 4755 (in part) (UNC).

This species was reported from North Carolina by Dyal (RHODORA 40: 203. 1938), as follows: "Hyam's Garden, Statesville, June 6, 1879, *Redfield No. 11736*;" in her note on general distribution of this species, she said: "Specimen from North Carolina without doubt cultivated."

VALERIANELLA OLITORIA (L.) Poll. (*V. Locusta* Beteke). WAKE Co.: roadside, Dix Hill near Raleigh, April 24, 1937, *Godfrey*; margin of pond, Pullen Park, Raleigh, April 28, 1951, *Fox 4579*; WARREN Co.: alluvium in moist woodland, Ridgway, April 20, 1938, *Godfrey 3640* (G).

This introduced species was reported by Dyal (*ibid.*, 191) only from Chapel Hill, Orange County: Chapel Hill, April 1891, F. B.

Maxwell. It was included by Blomquist and Oosting (1948) as *V. Locusta* (L.) Betsche.

VALERIANELLA PATELLARIA (Sulliv.) Wood RANDOLPH Co.: meadow, south side of Uwharrie Creek, west of highway No. 49, May 5, 1950, *Blomquist, Anderson and Batson 14898*; abundant in a bottomland field, along the Deep River, U. S. Rt. 64, near Franklinville, May 6, 1950, *Godfrey & Fox 50339*. This species was reported by Dyal (*ibid.*, 194) from Swain County: *Biltmore Herbarium 4755* (in part).

VALERIANELLA RADIATA (L.) Dufr. var. FERNALDII Dyal CRAVEN Co.: roadside, 1 mile west of Vanceboro, highway No. 43, April 13, 1950, *Blomquist 14954*; ONSLOW Co.: roadside, main weather station, Hofmann Forest, April 12, 1948, *Boyce & Woods*; WAKE Co.: old field, Raleigh, April 20, 1938, *Godfrey 3557*; ORANGE Co.: U. N. C. campus, May 4, *Coker* (UNC). This taxon was reported from North Carolina by Dyal (*ibid.*, 207) only from Buncombe County: *Biltmore Herbarium 4755a* (in part).

LOBELIA BOYKINII T. & G. BLADEN Co.: in about 15 inches of water, borrow pit pool, 2.5 miles east of Elizabethtown, July 9, 1949, *Godfrey and Fox 49493*.

McVaugh (RHODORA 38: 327. 1936) cites no stations from between Delaware and South Carolina, and the range in Gray's Manual (1950) indicates the same disjunction. We are indebted to Dr. McVaugh for the determination of our collection.

EUPATORIUM CUNEIFOLIUM Willd. DARE Co.: scattered in woodland on old stabilized dunes, vicinity of Kill Devil Hill, October 6, 1950, *Godfrey and Fox 51026*.

Two North Carolina records have previously been reported for this species (Fox and Godfrey, 1949; Godfrey, Journ. Elisha Mitch. Sci. Soc. 66: 187. 1950). This, the third, is approximately 200 airline miles northeastward from the other coastal station in Brunswick County. Fernald (RHODORA 37: 446. 1935) reported this plant from southeastern Virginia as, "apparently an extension north from South Carolina." Godfrey has examined Fernald's specimen and in his opinion Fernald misidentified the plant. His specimen, which is immature, is thought to be *Eupatorium Mohrii* Greene.

EUPATORIUM RESINOSUM Torr. CUMBERLAND Co.: sphagnous shrub bog, 13 miles n. of Fayetteville, October 27, 1950, *Godfrey & Boyce 50948*; cartroad, just east of dam, at Thode's Pond, 1.5 miles n. e. of Godwin, October 7, 1951, *Fox 5620*.

This is previously unreported for the range of Small's Manual (1933) and heretofore known only from bogs in pine barrens of New Jersey and Delaware, with a described variety in Kentucky.

CHRYSOPSIS PINIFOLIA Ell. WAYNE Co.: old field, sterile sandy ridge, on N. C. Rt. 111 s. of Goldsboro, 2 miles n. of Neuse River, September 22, 1950, *Godfrey, Fox & Boyce 50634*.

Until recently (Fox and Godfrey, 1949; Godfrey *ibid.*, 188), this plant was unknown except from the type locality in Taylor County, Georgia. This, the third North Carolina station, extends the range eastward approximately 50 miles.

SOLIDAGO RIGIDA L. DURHAM Co.: mixed pine-deciduous flatwoods, near Eno River, north of Durham, September 22, 1951, *Godfrey 51196*.

We have seen neither specimens nor records of the occurrence of this goldenrod outside of the mountain region of the state and feel it worthwhile to record this outer piedmont station.

SOLIDAGO SCIAPHILA Steele. BRUNSWICK Co.: in live-oak scrub thickets on sand dunes, Long Beach, October 28, 1950, *Godfrey & Boyce 50963*.

The distribution of this species is given by Fernald in Gray's Manual (1950) as: "ledges, cliffs, and sands, w. Ont. and Mich. to Minn., s. to Ill. and n. e. Ia." The above collection was identified by Dr. Arthur Cronquist and it was rechecked by him after several duplicate specimens were sent to him. Godfrey also checked specimens of the collection against material of the species at the Gray Herbarium, and he concurs with Dr. Cronquist in his determination. We are at a complete loss to account for the occurrence of this goldenrod so far from the hitherto known range of its distribution. This North Carolina Station is on the coast in the extreme southeastern corner of the state, in a remote locality only now being encroached upon by the "beach population." The plant was fairly abundant there and had all the appearances of a "native."

SOLIDAGO ULIGINOSA Nutt. (*S. neglecta* T. & G.). MOORE Co.: sphagnous shrub-bog, just west of Eastwood, October 12, 1950, *Godfrey 50724*; CUMBERLAND Co.: sphagnous shrub-bog, 13 miles north of Fayetteville, October 27, 1950, *Godfrey & Boyce 50950*.

According to Gray's Manual (1950), this goldenrod, which has a wide distribution in the northeast, is known south of Delaware



and Maryland only in the upland of North Carolina. These two stations are in the inner coastal plain.

ASTER MIRABILIS T. & G. UNION Co.: bank of Lane's Creek, 1.2 miles n. of Sturtevant, July 8, 1950, *Fox and Whitford 3886*.

A second North Carolina station for this plant, which until reported by Godfrey (*ibid.* 188) for Anson County, had been unknown from other than the type locality near Columbia, South Carolina.

GNAPHALIUM FALCATUM Lam. NEW HANOVER Co.: Carolina Beach, May 13, 1937, *Wells & Shunk*; abundant in grass-weed border, roadside, Greenfield Park, Wilmington, May 13, 1950, *Godfrey & Wiebe 50358*.

This is an extension of range northward from South Carolina, Weatherby and Griscom (*RHODORA* 36: 51. 1934) having reported it from Myrtle Beach, Horry County. Until then, it had been unknown north of Florida.

AMBROSIA PSILOSTACHYA DC. RICHMOND Co.: wire-grass, turkey oak sandhills, 5.5 miles s. w. of Hamlet, along N. C. Rt. 77, September 16, 1950, *Godfrey & Fox 50568*. An adventive previously unreported for the range of Small's Manual (1933), it is well established at this locality.

XANTHIUM ECHINATUM Murr. DARE Co.: sand dunes, Nag's Head, October 6, 1950, *Godfrey & Fox 51037*.

Although Small (1933) gives the range of this plant as, "various provinces, N. C. to Nebraska, N. D., and Me.," Fernald in Gray's Manual (1950) says that it occurs "along the coast, N. S. to Va." This record establishes its occurrence in coastal North Carolina.

SANTOLINA CHAMAECYPARISSUS L. LEE Co.: edge of road clearing, on high turkey-oak sand ridge, 8 miles south of Sanford on U. S. Rt. 1, May 20, 1951, *Fox 4659*; BUNCOMBE Co.: road bank, on Beucatcher Road, 2 miles north of center of Asheville, June 14, 1951, *Fox & Beaman 4791*.

This European introduction is obviously adventitious and very well established at these two widely separated localities. These collections are listed here because the plant is not included by Small (1933).

PRENANTHES TRIFOLIATA (Cass.) Fern. CURRITUCK Co.: burned-over loblolly pine flatwood, 2.3 miles w. of Barco, October 5, 1950, *Godfrey & Fox 51000*.

A careful check of the large eastern herbaria, as well as the local herbaria, failed to reveal any specimens of this species from the coastal plain province in North Carolina. It was abundant

and conspicuous at this station on the outer coastal plain. We have never encountered it elsewhere in eastern North Carolina. Interestingly, it has not been found in adjacent southeastern Virginia.—DIVISION OF BIOLOGICAL SCIENCES: BOTANY, NORTH CAROLINA STATE COLLEGE, RALEIGH, NORTH CAROLINA AND DEPARTMENT OF BOTANY, DUKE UNIVERSITY, DURHAM, NORTH CAROLINA.

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SOME CRUCIFERAE OF THE NASHVILLE BASIN,  
TENNESSEE

REED C. ROLLINS

THE affinity of many representatives of the Cruciferae for limestone and gypseous areas is well known. Evidently the highly calcareous soils of the Nashville Basin (Fenneman, 1938) have provided particularly suitable habitats for the extensive development of two genera of the Cruciferae. All four species of the unique genus *Leavenworthia* are found in this relatively small area and two of them are largely confined to it (Baldwin, 1945). Plants of *L. aurea*, *L. stylosa*, *L. torulosa*, and *L. uniflora* are extremely abundant in the open glades, pastures and old fields at particular locations, often covering several to many acres of land. The opportunity for hybridization between the species of *Leavenworthia* is certainly present, for they occur together in some places. In my own experience, *L. stylosa* and *L. uniflora* were found together at two locations, but mostly the species were in pure stands. In some instances these were not separated by more than a few hundred yards. Gattinger in a letter to Gray (cf. Baldwin, l. c.) claims to have found three species in one square yard of ground near Nashville. Certainly the types of habitats in which all species occur in the Nashville Basin are very similar. I noticed a tendency for *L. uniflora* to invade old cornfields where the plants often covered a field of a dozen acres or more. This species tends to flower earlier than the other three and is the most distinctive, but all species can be found flowering at the same time and growing in close proximity, if not together, in a number of locations. Many plants in several such localities were carefully examined for traces of introgressive hybridization. However, no evidence that natural hybridization occurs between any combination of the species could be found. It seems safe to conclude that hybridization is not a major factor in producing the variability that does occur in the species in central Tennessee.